Phenol biodegradation by free and immobilized candida tropicalis RETL-Cr1 on coconut husk and loofah packed in biofilter column

Abstract

Phenols and its derivatives are environmental pollutant commonly found in many industrial effluents. It is toxic in nature and causes various health hazards. However, they are poorly removed in conventional biological processes due to their toxicity. Immobilization of microbial cells has received increasing interest in the field of waste treatment and creates opportunities in a wide range of sectors including environmental pollution control. Live cells of phenol-degrading yeast, Candida tropicalis RETL-Cr1, were immobilized on coconut husk and loofah by adsorption. The immobolized particle was packed into biofilter column which used for continuous treatment of a phenol with initial phenol concentration of 3mM. Both loofah and coconut husk have similar phenol biodegradation rate of 0.0188 gL-1h -1 within 15 hours to achieve a phenol removal efficiency of 100 %. However loofah have lower biomass concentration of 4.22 gL-1 compared to biomass concentration on coconut husk, 4.39 gL-1. Coconut husk contain higher biomass concentration which makes it better support material than loofah. Fibrous matrices such as loofah and coconut husk provide adequate supporting surfaces for cell adsorption, due to their high specific surface area. Therefore, coconut husk and loofah being an agricultural waste product have the potential to be used as low-cost adsorbent and supportmatrix for microbial culture immobilization for the removal of organic pollutant from wastewater.